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Lecture 2: Sponsored by EURASIP

It Knows What's on Your Mind: Brain-Computer Interfaces by Anton Nijholt

Brain-computer interfacing has become a topic of interest for computer scientists and in particular human-computer interaction researchers. They are looking for applications that add the brain-activity modality to other multi-modal ways of interacting with 'computers'. That is, a modality that can be added to the usual mouse and keyboard control of applications. But, also a modality that can be added to existing ideas about sensor-equipped environments and devices that also take as input information obtained from auditory, visual, tactile and physiological sensors. We review and discuss possibilities (and limitations) of brain-computer interfacing. That is, we look at the possibilities of on-line control of entertainment applications and on-line adaptation of an application based on a user's brain activity. Embedding such use of BCI in a multimodal context is an issue that will be addressed. The presentation will be concluded with examples of our research on entertaining brain-computer interface applications and observations on future applications that require collaborative and synchronized brain activity from several users or gamers and future applications where BCI gets embedded in social signal processing technology.

Literature

A. Nijholt, D.S. Tan, G. Pfurtscheller, C. Brunner, J. del R. Millán, B. Allison, B. Graimann, F. Popescu, B. Blankertz, K.-R. Müller (2008). Brain-Computer Interfacing for Intelligent Systems. IEEE Intelligent Systems, 23 (3). pp. 72-79.

A. Nijholt, D. Oude Bos, B. Reuderink (2009). Turning Shortcomings into Challenges: Brain-Computer Interfaces for Games.<http://dx.doi.org/10.1016/j.entcom.2009.09.007> Entertainment Computing 1 (2), Elsevier, 85-94.

H. Gürkök, A. Nijholt (2012). Brain-computer interfaces for multimodal interaction: a survey and principles.<http://www.informaworld.com/10.1080/10447318.2011.582022>International Journal of Human-Computer Interaction, Taylor & Francis Publishers, Vol. 28, Nr. 5, 2012, 292-307

A. Nijholt, B.Z. Allison, R.K. Jacob (2011). Brain-Computer Interaction: Can Multimodality Help? In: Proceedings 13th International Conference on Multimodal Interaction, H. Bourlard et al. (Eds.), Alicante, Spain, ACM Digital Library, 35-39.